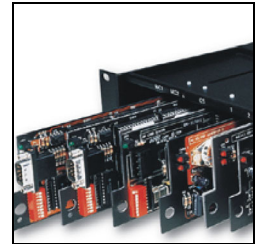
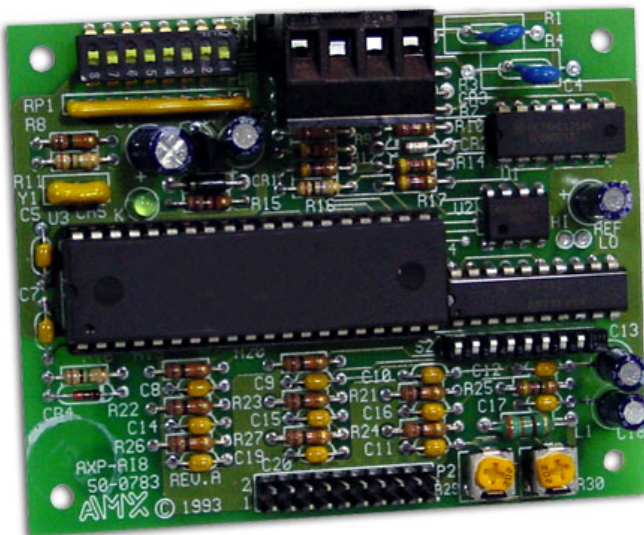




# AXP-AI8

Eight-Channel Analog Input  
Interface Board



Custom Panel Interfaces

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# Product Information

The AMX Eight-Channel Analog Input Interface Board (AXP-AI8) is a 10-bit analog-to-digital interface board used to integrate remote analog sources, such as joysticks or potentiometers (POTs), with AMX Access systems.

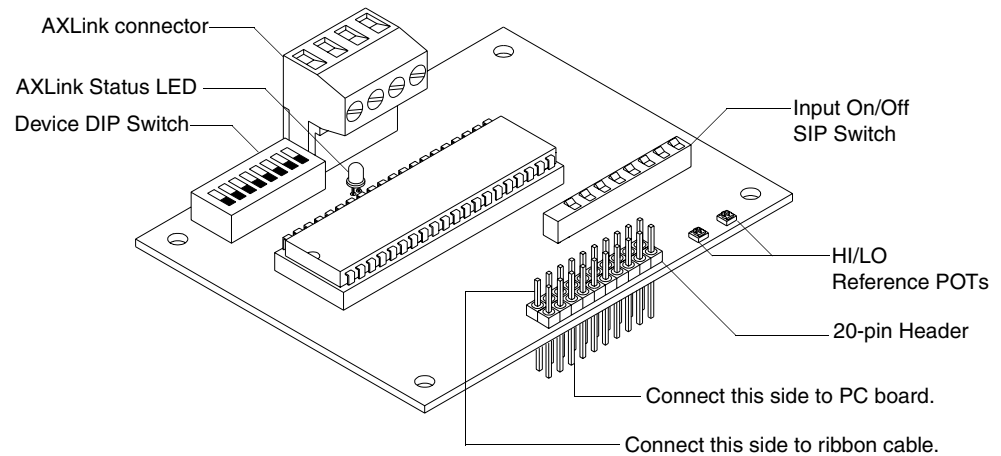


FIG. 1 AXP-AI8

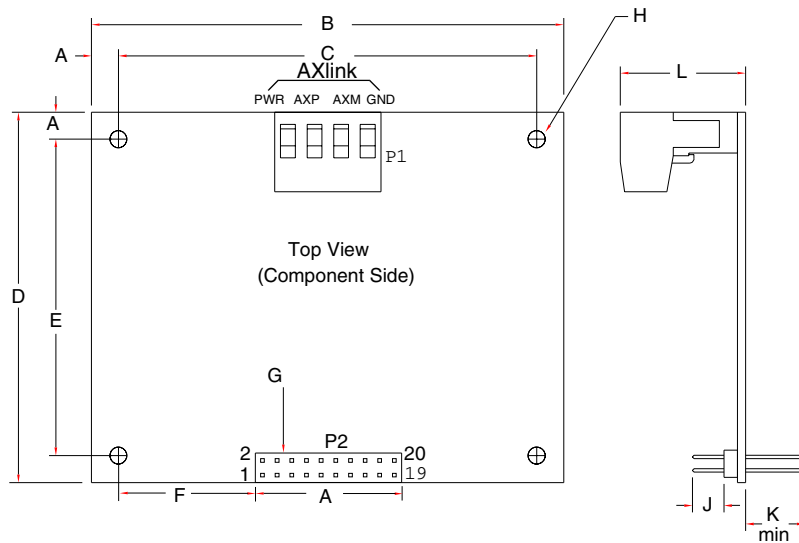
## Specifications

| Specifications      |   |
|---------------------|---|
| 20-pin Berg header  | Connects to either a ribbon cable (up to 30 feet) or mounts directly into a PC.   |
| AXlink connector    | A 4-wire AXlink data/power bus operation.   |
| AXlink Status LED   | Green LED shows AXlink data activity. Blink patterns include: <ul style="list-style-type: none"> <li>• Off - No power, or the controller is not functioning properly.</li> <li>• One blink per second - Normal operation. Device numbers match the programmed device numbers in the Axxcess program.</li> </ul> |
| Cables              | 3 feet (91.4 cm) of ribbon cable with a female 20-pin header.   |
| Device DIP Switch   | 8-position device DIP Switch to set the AXP-AI8 as an AXlink device.  |
| POTs                | HI and LO reference POTs maximize the resolution of joystick operation.   |
| Power requirement   | Inputs accept POTs (5K to 100K) or an external DC voltage (0-5V).   |
| Input voltage range | Input voltage range of 0 to +5volts (maximum input voltage is +5volts)  |
| Signal Inputs       | 8 analog inputs, measured with 10 bit resolution.   |
| SIP Switch          | 8-position SIP Switch to turn off unused inputs.  |

To create a wiring diagram, use the AXP-AI8 System Worksheet on page 7.

## Dimensions and Descriptions

FIG. 2 shows the dimensions of the AXP-AI8:



**FIG. 2** AXP-AI8 dimensions

| Item | Inch  | mm    | Item | Description   |
|------|-------|-------|------|---|
| A    | 0.20  | 5.10  | G    | 20-Pin Header - .025 inch (6 mm) square pins, .1 inch (2.4 mm) typical spacing. |
| B    | 3.50  | 88.90 | H    | .125 inch (3.2 mm) mounting holes for #4-40 (3 mm) screws.                      |
| C    | 3.10  | 78.70 |      |   |
| D    | 2.75  | 69.90 |      |   |
| E    | 2.35  | 59.70 |      |   |
| F    | 1.10  | 27.94 |      |   |
| J    | 0.23  | 5.80  |      |   |
| K    | 0.438 | 11.10 |      |   |
| L    | 0.93  | 23.60 |      |   |

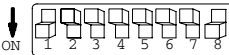
# Installation

## Configuring Switches

### Setting the Device DIP Switch

Use the eight-position device DIP switch to set the AXP-AI8 as an AXlink device. It can be one of 255 devices in an Axxess system. The device number must match the assignment of the device in the Axxess program. Set the device number with the total of all ON (down) positions. For example, the DIP switch below defines device number 129 ( $1+128=129$ ).

| Switch | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8   |
|--------|---|---|---|---|----|----|----|-----|
| Value  | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 |



AMX standard device numbers are assigned as follows:

- Cards are 1 through 95.
- Boxes are 96 through 127.
- Panels are 128 through 255.

The device number takes effect only on power-up. If you later change the device number, remove and reconnect the AXlink connector. This enters the new device number into memory.

### Setting the input SIP switch

Set the SIP switch positions to ON (down) to disable the corresponding unused inputs. For example, switch position 1 corresponds to input 1. In the illustration above, switches 1 and 8 are ON, designating that input 1 and 8 are disabled.

The default setting is all switch positions set to off, enabling all inputs.

### Setting the joystick range POTs

Most applications will use the factory default setting of the POTs and do not require any adjustment. In applications where the input signal is not powered by the AXP-AI8 board and the maximum input voltage range is less than 5 Volts, the output reading may be adjusted closer to full scale, providing greater resolution.

Determine the maximum voltage that will be input to the board. Make sure that the 'LO' POT (bottom right of board) (FIG. 3) is turned all of the way to counter-clockwise. Place the leads from a voltmeter across the 'HI' and 'LO' reference test points located on the right side of the board and adjust the 'HI' POT (bottom right of board) (FIG. 3) until the voltage on the meter matches the maximum that will be input.

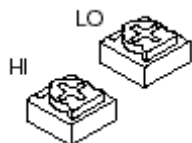


FIG. 3 AXP-AI8 POTs



Be sure that the board input ground is connected to the voltage source ground prior to applying a voltage to the input.

## Wiring

FIG. 4 shows typical joystick wiring:

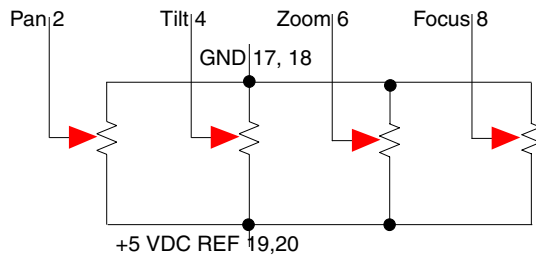


FIG. 4 Typical joystick wiring

### 20-Pin Header

The following table lists the pinouts for the 20-pin header:

| 20-Pin Header - Pinout Information |          |     |            |
|------------------------------------|----------|-----|------------|
| Pin                                | Function | Pin | Function   |
| 1                                  | GND      | 11  | GND        |
| 2                                  | INPUT 1  | 12  | INPUT 6    |
| 3                                  | GND      | 13  | GND        |
| 4                                  | INPUT 2  | 14  | INPUT 7    |
| 5                                  | GND      | 15  | GND        |
| 6                                  | INPUT 3  | 16  | INPUT 8    |
| 7                                  | GND      | 17  | GND        |
| 8                                  | INPUT 4  | 18  | GND        |
| 9                                  | GND      | 19  | +5 VDC REF |
| 10                                 | INPUT 5  | 20  | +5 VDC REF |

### AXlink

To install the AXlink data/power bus wiring:

1. Strip .25 inch off the wire insulation for all four wires. If the wire is 20 AWG or less, fold the exposed wire over to obtain a positive connection.
2. Insert each wire into the appropriate opening on the connector. See FIG. 4.
3. Turn the captive screws clockwise to secure the fit. Do not over torque the screw; doing so can bend the seating pin and damage the connector.

FIG. 5 shows the wiring configuration for AXlink cables.



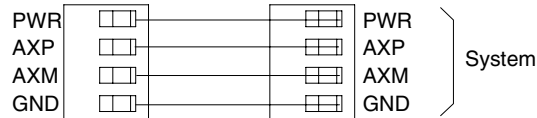


FIG. 5 AXlink wiring diagram

## Configuring the AXP-AI8

1. Set the device number.
2. Turn off any unused inputs.
3. Create a wiring diagram using the AXP-AI8 System Worksheet on page 7.
4. Connect the ribbon cable or the PC board to 20-pin header.
5. Connect the AXP-AI8 to the AXlink data/power bus.
6. Check the AXlink LED. It should blink once per second.

### Testing

1. If you have programmed the Axxess software, load the program into a PC connected to the control system Master port.
2. Select Diagnostics and Watch Variable; enter the name of the variable for Input 1.
  - Note the value of the variable when the joystick is in the center position.
  - Note the value of the variable when the joystick is at full right and left (or down and up) position.
3. Adjust the programming to reflect the actual values for the three positions.

Using this method, you have the option of using the HI and LO adjustments to achieve a full 0-5 VDC range, 2.5 V center, or to adjust the Axxess programming to the actual values sent from the AXP-AI8 inputs.

## Programming

This section covers programming information and examples for the AXP-AI8 Analog Interface Board.

### Levels

| Levels |   |
|--------|---|
| Level  | Function  |
| 1      | Voltage output channel 1 and joystick/slider control (0 - 255). |
| 5      | Voltage input channel 1 (0 - 255).                              |
| 2      | Voltage output channel 2 and joystick/slider control (0 - 255). |
| 6      | Voltage input channel 2 (0 - 255).                              |

### Send Commands

| Send Commands                      |                                    |
|------------------------------------|------------------------------------|
| SEND COMMAND AI8, " 'DELTA5 ' "    | Puts channel 5 in delta mode.      |
| SEND COMMAND AI8, " 'DELTA6 ' "    | Puts channel 6 in delta mode.      |
| SEND COMMAND AI8, " 'DELTA7 ' "    | Puts channel 7 in delta mode.      |
| SEND COMMAND AI8, " 'DELTA5 ON' "  | Puts channel 5 in delta mode.      |
| SEND COMMAND AI8, " 'DELTA6 ON' "  | Puts channel 6 in delta mode.      |
| SEND COMMAND AI8, " 'DELTA7 ON' "  | Puts channel 7 in delta mode.      |
| SEND COMMAND AI8, " 'DELTA5 OFF' " | Takes channel 5 out of delta mode. |
| SEND COMMAND AI8, " 'DELTA6 OFF' " | Takes channel 6 out of delta mode. |
| SEND COMMAND AI8, " 'DELTA7 OFF' " | Takes channel 7 out of delta mode. |



NOTE

*Delta mode should be used with continuous rotation potentiometers. It effectively filters out the dead zones and provides for smooth, uninterrupted readings.*

Inputs are controlled as Channels 1 through 8.

### Sample Application

This is an example of Access programming that is required before using an AXP-AI8.

#### Example 1:

```
PROGRAM_NAME='AI8_EX rev 1'
(* DATE:06/18/02 TIME:17:32:26 *)
(* Date: 12/18/2001 Time: 11:50:50 AM AXedit user: JSHMOE *)
(*{{PS_SOURCE_INFO(PROGRAM STATS) *}

(** FIRST, the program under studio can be written many ways          **)
(** but we have to stay within the boundaries of the compiler and      **)
(** use of KEYWORDS. This file was created for an AXCESS system        **)
(** master and when compiling in AXCESSX, the word BUTTON is NOT a KEYWORD **)

(*****
(* FILE CREATED ON: 06/09/2000 AT: 13:56:05 *)
(*****
(* FILE_LAST_MODIFIED_ON: 04/25/2001 AT: 16:59:10 *)
(*****
```

↓ Continued

```

(* ORPHAN_FILE_PLATFORM: 1 *)
(*****)
(*!!FILE REVISION: Rev 0 *)
(* REVISION DATE: 04/24/2001 *)
(* *)
(* COMMENTS: *)
(* *)
(*****)
(*)}PS_SOURCE_INFO *)
(*****)
(* DEVICE NUMBER DEFINITIONS GO BELOW *)
(*****)
DEFINE_DEVICE
AI8 = 64 (* EIGHT INPUT ANALOG BOARD *)
TP = 128 (* TOUCH PANEL *)
(*****)
(* CONSTANT DEFINITIONS GO BELOW *)
(*****)
DEFINE_CONSTANT
xBUTTON = 101 (* CHANNEL NUMBER FOR TOUCH PANEL BUTTON *)
//BUTTON = 101 (* CHANNEL NUMBER FOR TOUCH PANEL BUTTON *)
(*****)
(* VARIABLE DEFINITIONS GO BELOW *)
(*****)
DEFINE_VARIABLE
(* If you create a variable array then you have to call one of these array
elements below *)
(* Or setup the variables without an array *)
(*
IN1[2] (* VARIABLES IN WHICH TO STORE *)
IN2[2] (* ANALOG INPUT VALUES (LEVELS)*)
IN3[2]
IN4[2]
IN5[2]
IN6[2]
IN7[2]
IN8[2]
*)

IN1// (* VARIABLES IN WHICH TO STORE *)
IN2 (* ANALOG INPUT VALUES (LEVELS)*)
IN3
IN4
IN5
IN6
IN7
IN8

(*Each variable needs two bytes to hold the
input value which is why the form [2]
is used.*)
(** Each element of the array in this case will hold the Integer value **)
(*****)
(* LATCHING DEFINITIONS GO BELOW *)
(*****)
DEFINE_LATCHING
(*****)
(* MUTUALLY EXCLUSIVE DEFINITIONS GO BELOW *)
(*****)
DEFINE_MUTUALLY_EXCLUSIVE
(*****)
(* STARTUP CODE GOES BELOW *)
(*****)
DEFINE_START
CREATE_LEVEL AI8,1,IN1 (* HERE WE ASSOCIATE EACH AI8 *)

```

Each variable needs two bytes to hold the input value which is why the form [2] is used.

↓ Continued

```

CREATE_LEVEL AI8,2,IN2      (* INPUT WITH A VARIABLE NAME *)
CREATE_LEVEL AI8,3,IN3      (* IN WHICH TO STORE THE INPUT *)
CREATE_LEVEL AI8,4,IN4      (* ANALOG VALUE (LEVEL) *)
CREATE_LEVEL AI8,5,IN5
CREATE_LEVEL AI8,6,IN6
CREATE_LEVEL AI8,7,IN7
CREATE_LEVEL AI8,8,IN8
(*)
CREATE_LEVEL AI8,1,IN1[1]   (* HERE WE ASSOCIATE EACH AI8 *)
CREATE_LEVEL AI8,2,IN2[1]   (* INPUT WITH A VARIABLE NAME *)
CREATE_LEVEL AI8,3,IN3[1]   (* IN WHICH TO STORE THE INPUT *)
CREATE_LEVEL AI8,4,IN4[1]   (* ANALOG VALUE (LEVEL) *)
CREATE_LEVEL AI8,5,IN5[1]
CREATE_LEVEL AI8,6,IN6[1]
CREATE_LEVEL AI8,7,IN7[1]
CREATE_LEVEL AI8,8,IN8[1]
*)
(*****
(* THE ACTUAL PROGRAM GOES BELOW *)
(*****
DEFINE_PROGRAM
//IF(IN1[1] < 51) (* THE LEVELS FROM THE AI8 RANGE FROM *)
IF(IN1 < 51)      (* THE LEVELS FROM THE AI8 RANGE FROM *)
{ (* 0 - 1023 *)
// ON[TP,BUTTON]
// ON[TP,101]
ON[TP,xBUTTON]
}
//IF(IN5[1] = 795)
IF(IN5 = 795)
{
OFF[TP,xBUTTON]
// OFF[TP,BUTTON]
//OFF[TP,101]
}
(*****
(* END OF PROGRAM *)
(* DO NOT PUT ANY CODE BELOW THIS COMMENT *)
(*****

```



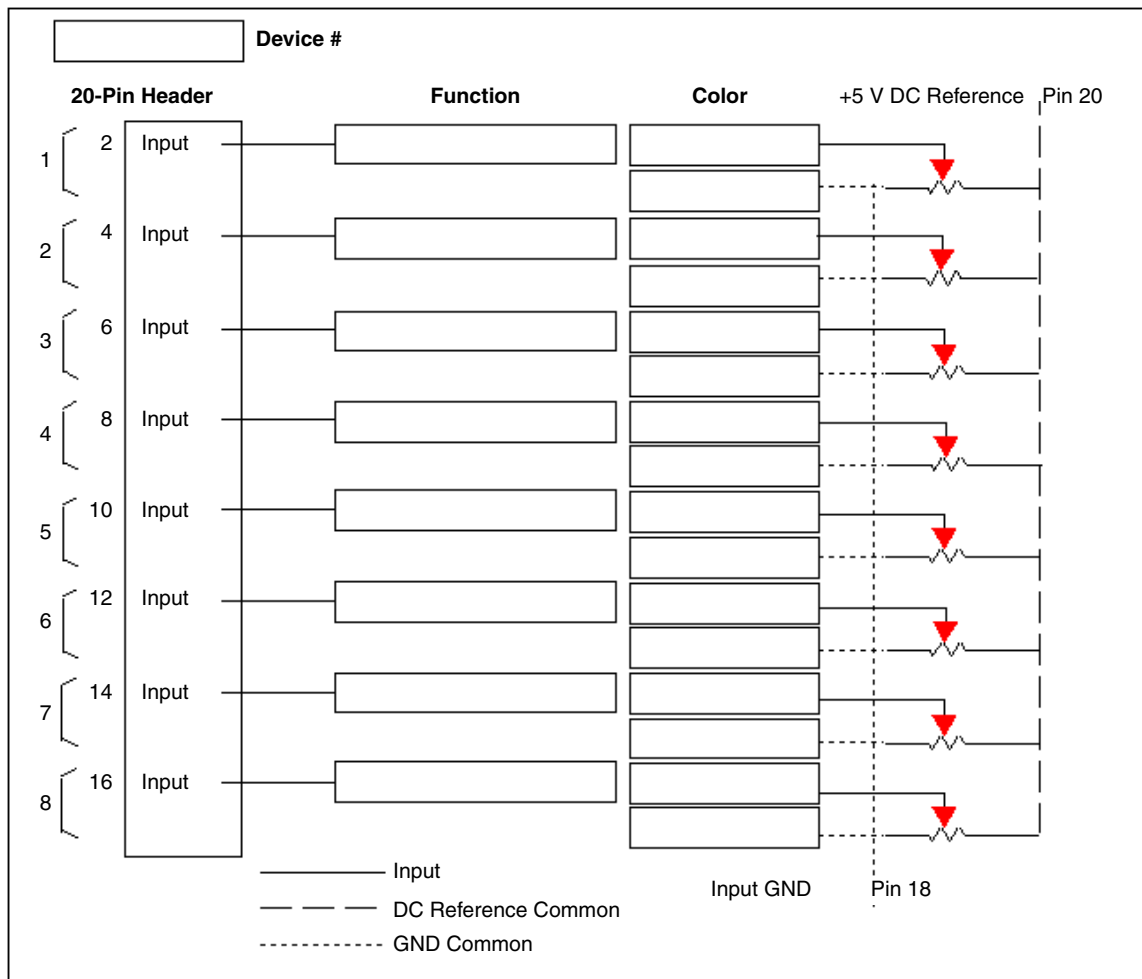
NOTE

Each variable needs two bytes to hold the input value which is why the form [2] is used (ex: [2] makes it a two-byte variable).

For additional information, refer to the *Access Programming Language* instruction manual.

# System Worksheet

|                    |                 |
|--------------------|-----------------|
| Dealer ID #: _____ | Date: _____     |
| Dealer: _____      | PO#: _____      |
| Job: _____         | SO#: _____      |
| Description: _____ | Serial #: _____ |
|                    | Rev# : _____    |





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